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East Europe Report

SCIENTIFIC AFFAIRS

No. 682

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BRIEFS

CSSR PIPE DELIVERIES TO USSR--By 14 August 1980, the Pipe Rolling Mills and Iron Works in Chomutov, CSSR, have delivered 4 million tons of expanded pipes to the USSR. The 530- and 720-mm diameter pipes are used in gas and oil pipelines. The enterprise expanded its exports to the USSR during the past 2 years, also delivering precision-made special stainless steel pipes. Besides the 201,000 tons of expanded pipes slated for the USSR deliveries in 1980, the CSSR will also deliver 5,000 anticorrosive steel alloy pipes. [Prague PRACE in Czech 15 Aug 80 p 1]

CSO: 2402

SPECIALISTS RESPOND TO CRITICISM ON COMPUTERS' USE

Sofia TRUD in Bulgarian 15 Jul 80 pp 1-2

[Commentary: "Right Steps in the Right Direction"]

[Text] The use of computers has been the subject of a discussion in TRUD over the past several months. Considering its importance, topical nature, and connection with the task of intellectualizing production, the State Committee for Science and Technology decided to hold a special meeting on the subject. The meeting was attended by Lazar Lazarov, deputy chairman of the committee; Ivan Tenev, deputy minister of electronics and electrical engineering; and Stanislav Dimitrov, deputy chairman of the Committee for the Unified System of Social Information.

The three managers commented on the views expressed by the readers and earmarked the strategy to be followed in this area important to the country.

Lazar Lazarov: "We are already facing facilities and the environment around us with new quality requirements which involve the use of the computer. . . ."

Ivan Tenev: "The computer demands a strict organization, discipline, and responsibility in handling. . . ."

Stanislav Dimitrov: "A current condition for the effective application of computers is for the data to be gathered on a one-time basis and used repeatedly."

Ivan Tenev: We Go Back to Man!

Let me begin with a thought which was emphasized, one way or another, in the debate sponsored by TRUD: In order for computers to be effective, in addition to high technical qualities they require trained cadres, organization, servicing, and others. It is precisely at this point that the two main factors which determine effectiveness--the subjective and the objective--come together. That is why the departments in charge of the creation and utilization of computers are working in the two directions.

As the main producer of computers in our country, the Ministry of Electronics and Electrical Engineering is in charge of both the level of technical facilities and their servicing. This aspect of the problem or, more specifically, the activities of our Izotserviz service organization, was not neglected in the materials published. The problems were accurately described: availability of spare parts, quality of maintenance, and others. How are we resolving them? Above all, by improving the Izotserviz technical base. At the same time, we see to it that consumer users in the country are given better training in operating the electronic equipment.

The question of steadily upgrading the skills of the personnel operating computers is particularly important. A frequent paradox is the following: A special document is required to operate far simpler equipment, whereas operating a machine costing hundreds of thousands of leva does not require it. Order is already being introduced thanks to the National Training Center. We have issued our servicing organization to seal computers handled by unskilled personnel. This measure, extensively applied in the USSR, has proved to be both necessary and useful.

I would like to discuss yet another aspect related to the use of computers. The following recommendation was issued in the course of the discussion: "It is time to consider as part of reality and become used to the fact that at the present stage an economic manager who has not mastered the use of computers does not have a great future." I would go even further by saying that anyone related to enterprise management must realize that if not today tomorrow he will be using a computer. This requires proper training, both technical (which is easier) and mental.

The computer must be trusted. There have been cases in which computer results have been checked manually (naturally, this easily reveals a doubt of one's own readiness to handle such equipment!). An electronic machine calls for strict organization, discipline, and responsibility in handling it. Let us remember that even the smallest error of the information supplied will be multiplied into hundreds of errors.

The "soul" of the computer, the concentrated manifestation of intellectualization, is program support. Justifiably, this was discussed in the newspaper. It is no secret that the effectiveness with which computers are used largely depends precisely on the effectiveness of the programming. A number of major steps are being taken from the positions of the economic approach leading to the development of programming on an industrial basis. On the instructions of the government currently a special scientific program is being drafted on this matter.

Stanislav Dimitrov: The Individual Centers Must Become a Single "Blood Circulation System"

Several publications in the course of the discussion dealt with advance preparations to be made by the enterprises using computers: high level organization and discipline, production mechanization, proper technological and design documentations--everything necessary for the development of an adequate reference base. That is how one begins. Whose job is this? It is the job of the technologist, designers, planning workers, accountants, and so on, i.e., anyone involved in production management. It is with such a combination of efforts that we were able to formulate a counterplan at the Podem Electric Hoists Plant in Gabrovo with the help of a computer.

This is one aspect of the matter. Another one is for the established centers to be linked within an integral "blood circulation system" involving all enterprises and organizations which need the use of a computer. We are as yet to resolve this problem which requires the extensive use of modern communications facilities and systems and well as minicomputers. It is important for it will improve the effectiveness of the computers: that which must be accomplished at the plant will be accomplished there, while the rest will be fed to the territorial information-computer center or to a center on the national level depending on requirements. This will reduce the processing cycle and increase the responsibility of those directly using the results. They themselves will participate in the feeding of data and obtain the prepared information.

As to the training of cadres by the National Training Center, we are trying to make it more purposeful, gradually improve curriculums, promote the spirit of the new, and relate theory with practice and practical requirements.

The criticism voiced to the newspaper of the uneven loading of the centers is accurate. This represents the conventional organization of accounting: closing the accounts at the end of the month, the quarter, and so on, for which reason peak loads develop. Are there solutions? There are two.

The first is to create reserve capacities not in the individual center, for this is expensive, but on the scale of the technical base of the unified social information system. Naturally, this calls for the integration of computers with communications facilities. Under the guidance of the State Committee for Science and Technical Progress, the Ministry of Electronics and Electrical Engineering, the Committee for Unified Social Information Systems, and the Ministry of Communications are working in this direction.

The second solution is the automation of all management subsystems: material and technical supplies, labor and wages, financial-accounting activities, and so on, in order to create conditions which will accelerate the accountability cycle. In this respect the successful staggering of the deadlines for closing down individual accounts would help.

A modern requirement for the effective application of computers is for the information to be collected once and used repeatedly. This could be accomplished through the development of so-called data banks. Work is being done in Bulgaria in that direction. We pay attention not only to the technology involved in the development of such data banks but, particularly, to the content--the type of data they store. Currently we are formulating a general plan for the distribution of information resources within the unified system for social information which will be coordinated with all interested departments.

Lazar Lazarov: Material Production Problems Are the Focal Point of Attention

I must express my satisfaction from the fact that TRUD offered the opportunity to the specialists to express their views on a truly major and topical problem. The participants in the discussion proved to be not only well acquainted with the topic but to have a proper feeling of their own possibilities and obligations. It is true that the responsibility does not lie exclusively in ministries, departments, or superior organizations, but on our entire scientific and technical and application potential, on every specialist in this area. What is the view of the State Committee for Science and Technical Progress?

A great deal of the existing weaknesses which we have repeatedly discussed stem from the fact that we "took" computers and placed them under the conditions of the existing technology and labor organization. In other words, we used computers under the conditions of a nonrationalized production management system. Consequently, our main task now is to find a proper solution to the problems of relating computers with the new equipment, technology, and organization. We are already formulating qualitatively new requirements concerning the environment in which a computer is to operate: a certain technological standard, a normative base, the economic interests of the enterprise as a whole and of the directly involved people, and so on. The position of the committee is expressed in the program being formulated for the automation of production and management in material production sectors in the future.

Like all other interested organs and organizations, the State Committee for Science and Technical Progress is considering the development of systems (systems, precisely!) involving the use of computers, most closely related to the development of the production process itself, its reconstruction and modernization, and management requirements. Under such circumstances and conditions, the attitude of the people who will develop and apply the systems involving the use of computers will be entirely different.

In order to be able to apply the brigade organization of labor more completely and more successfully, and reach the individual worker who should be aware on a daily and even hourly basis of what he has produced. how much labor and materials he has invested and, correspondingly, what his wages would be, we must absolutely "remember" the computer by objective necessity. (Otherwise we would need tens and hundreds of people in each enterprise to record and compute all day long.) Let me point out as an example the practice of the condensers plant in Kyustendil, an enterprise with a very good organization, technology, and equipment, and with a modern approach to managers and specialists. Even without its own computer, the enterprise makes effective use of the territorial center and is involving the use of a computer in enterprise management.

The State Committee for Science and Technical Progress is also resolving, on a parallel basis, the problems of the technical base, of automation systems involving the use of computers, and their extensive programming support without which, as we know, there would be nothing but a pile of junk.

As to cadres....for years on end this work was assigned to the higher educational institutions and various courses. Our ambition is to relate preparations for the new problems to be resolved in the next five-year plan, orienting them toward the needs of the corresponding sector, enterprise, organization, administration, and so on.

Another major problem on which we are also working and which must be resolved on a far broader scale than in the past is the use of computers in scientific research, designing and engineering. Unfortunately, despite the positive solutions and efforts, we can still not boast of any particular results.

Another direction followed in our activities is entrusting the committee's specialists, together with the corresponding departments, to make the existing norms governing the utilization of computers consistent with the requirements of the economic mechanism. A new regulation has been drafted which will soon become effective.

Finally, on behalf of the State Committee for Science and Technical Progress, the Ministry of Electronics and Electrical Engineering, and the Committee for Unified Social Information System, to thank the editors of TRUD and recommend that the topic under discussion be continued to be discussed by the newpaper. Along with a criticism of shortcomings, it would be very useful to popularize leading and positive experience.

5003
CSO: 2202

MINISTRY OF ELECTROTECHNICAL INDUSTRY, ITS FUTURE TASKS

Prague JEMNA MECHANIKA A OPTIKA in Czech Jun 80 pp 145-148

[Article: "On the Problems of the Development of an Electronics Industry"]

[Text] Not long ago matters led to the creation of the Federal Ministry for the Electrotechnical Industry. This was certainly no great surprise in professional circles. Rather, the question could arise in the general populace, as well as in engineering circles, as to why there is a need to create a new central agency of federal administration at a time when we are attempting to reduce the management and administrative apparatus. And although this question is related to others which we want to discuss in this article, it is still necessary to say a few words about it.

The ministry directs the whole electronics (light-current) industry, including the production of automation, calculation, instrumentation, regulation, health, laboratory and time measurement technology, as well as a majority of the CSSR's heavy-current industry. Electrical engineering and electronics have become an autonomous, special industrial sector employing 220 thousand workers in production, research, development and management. Essentially, there is no need to increase the administrative and management apparatus, since the apparatus of the ministry will be taken from existing general directorates, and principally from the general directorate of Tesla. Given an appropriate means of centralization of several activities within the concern type of economic production unit, the preconditions exist for a streamlining of management and administration and for the flexible resolution of economic problems arising in individual economic production units. Specific established positions from departments of the Federal Ministries of General and of Heavy Engineering and the previous directorate of TESLA national enterprise will be used to create the necessary number of defined positions for the Federal Ministry of the Electrotechnical Industry and to build up the organizations of the new TESLA concern economic production units.

Now we will outline the concrete reasons for this new organization and primarily the tasks facing the electrotechnical industry during the coming years.

Forecasts for the year 2000 refute the assertation that current barriers to development in the realm of energy, as well as limitations on the labor force, raw materials and living conditions are factors having a long-term influence, with which we must reckon in the formulation of long-range plans and therefore during discussions of the structural development of our engineering industry as well.

It is becoming evident that the scientific-technical revolution will also create, in certain areas, new starting points for the gradual overcoming of existing barriers. This is the case in particular in the area of electronics and cybernetics and the newly created hybrids such as robotization. These technical trends are the potential bearers of capacities for artificial intelligence, for the optimization of decisionmaking and technological procedures, and for penetration into all sectors of the national economy.

It is possible to generalize the above mentioned reality with the statement that the penetration of electronics into all sectors of the national economy is a qualitatively new and universal factor in the contemporary development and influence of the scientific-technical revolution.

A consequence of this penetration is that the optimization of all informational and material-energy related procedures has been made possible, as well as the creation of new organizational schema in terms of both form and content, which will lead its final phase to the mastery and creation of artificial intelligence. Robots are a concrete example of this trend. It is not solely a matter, then, of individual applications, but truly of a horizontal penetration of electronics which is having as its consequence a change in product quality, technology and service in all branches of the national economy. The penetration of electronics is characterized as well by a change in organizational structure, in supplier relationships, and service. Individual branches are acquiring basic electronic innovations and using them to formulate their own relatively innovative and production oriented technological basis of electronic technology. We see the totality of this process of structurial change in the fact that this horizontal dispersion of electronics technology has not resulted in a lessening of the significance and role of the electronics industry. On the contrary, the electronics industry is creating a common systemic, and especially component base, the development of which is conditioning the realization of a penetration of electronics into the national economy. Nevertheless, a change of roles is arising on this foundation which must be taken into account in the development of the organizational structure of Czechoslovak engineering.

An analysis of world trends and single results of completed studies shows that the further intensive development of engineering and of the whole national economy will not be possible in the future without the adequate development of electronics and without assuring its persistent horizontal penetration into engineering fields and the branches of the national economy.

At the world level, despite the recent tradition of electronics (the appearance of a number of fields during and after the second world war) its products have influenced all branches of the national economy. At the same time the process of additional and ever deeper penetration into military technology, space research, manufacturing and nonmanufacturing procedures, administrative and management functions, and into completely new areas is not slackening, but on the contrary is increasing in intensity. The qualitative changes which the application of electronics has and will continue to call forth have contributed to no small extent to the formation of contemporary civilization and will to a decisive degree create its future form as well.

Under our conditions, electronics is also an accelerating factor exercising, in a decisive manner, an influence on further industrial and national economic development at a time of increasing material and energy limitations (energy, materials, labor force, complexity, etc.).

From 1960 to 1975 the following averages were achieved in the yearly extent of electronics growth:

Industry as a whole	6.0 percent
Engineering	8.1 percent
Electronics	15.1 percent

The more rapid growth rate of electronics resulted, by 1970, in a level of output representing 2.05 percent of total industrial production and 7.05 percent of total engineering production. A comparison with the growth rates of electronics in the other socialist countries shows that the apparently high growth rate for our electronics industry was good enough for only sixth place among these countries. The growth rate of electrotechnical production between 1970 and 1974 showed the following average yearly increases:

Romanian Socialist Republic (RSR)	23.2 percent
Bulgarian People's Republic (BPR)	21.0 percent
Hungarian People's Republic (HPR)	17.5 percent
USSR	17.0 percent
Polish People's Republic (PPR)	14.8 percent
CSSR	14.5 percent
German Democratic Republic (GDR)	12.1 percent

The increase achieved by the USSR are of interest with regard to the volume of electrotechnical output already achieved. The increases of the RSR, the BPR, and the HPR are worthy of special attention for the reason that in these cases we are not dealing with an increase in volume of any sort, but with increases represented by a new mix of state-of-the-art technology mastered on the basis of licenses from leading world manufacturers.

The comparison shows that the planned share of electronics output in Czechoslovak engineering production is low.

An additional reality which points to the low level of electronics development is the condition of the assurance of requirements. Deliveries of telecommunications technology for the Czechoslovak communications system and for export are not fully covered. There is insufficient production capacity for measurement and computational technology, and orders for fire alarms and security alarms are several times larger than production capacity. The gradual process of the penetration of electronics into the production sphere is bringing growing demands for management computers, for apparatus for automated data collection, and for the digital control of machine tools. Inventories of consumer goods are not covered in the area of consumer electronics. The field of domestic production of specialized machines, instruments, and apparatus for electronics technology is entirely uncovered, both in terms of domestic requirements, and for the satisfaction of the ever increasing export needs of the CEMA member countries.

Likewise, general trends point to a further increase in the needs of electronic technology. For instance, electronic technology accounts for 30 percent of the investment in contemporary blast furnaces. Sources in the United States state that electronics represents 6 percent of the 1980 automobile industry, and Soviet experts estimate that over the long term electronics will come to constitute 30 percent of the automobile industry, as is the case today in aviation. Similar trends are expected in agriculture, in metallurgical plants, in mines, in the textile industry, etc. This objective trend, the development of which stands right now before our electronics industry, is being called the electronic transformation of the national economy. This phenomenon is manifesting itself as well in the CSSR. The health electronics production group appeared recently, and matters have led to the broad introduction of ultrashortwave links (for firemen, in agriculture, for ambulances, taxis, rail transport, etc.), and ETZ 2 apparatus in mines. Nevertheless we are in the midst of the electronic transformation of the national economy by computers, and it is essential to anticipate increased demands in this direction.

Our electronics industry can fill these demands only in the event that it will be both qualitatively and quantitatively (technical specifications, price, reliability, service, etc.) prepared for this task. However, a substantial task also rests with those who will apply electronics to new branches, and on their preparedness to absorb electronics into both the technical-technological system of production and its applications.

These are, then, the concrete reasons that supervisory agencies of the party and the government have undertaken the organizational separation of the electrotechnical industry from the whole engineering complex. In the process, electronic (weak-current) specialties have been joined by professions either closely connected with weak-current specialties (the Prague High-Voltage Electrical Engineering Plants economic production unit), or professions which will be, due to their internal facilities, in all likelihood more and more dependent on component deliveries from the electronics industry.

A complex has been created in this manner which has more than 70,000 workers, controls approximately 14 percent of the country's fixed engineering assets, and produces more than Kcs 33 billion of goods. Between now and 1985, during the nation's Seventh Five-Year Plan, it faces extremely important and extremely demanding tasks.

Main Development Problems for the Future

The fundamental problem for the development of electronics, as well as of other related branches, is the modernization and full development of the component basis. While we can state that the classical basis of electronics has been fully mastered in the CSSR, the research and development basis is now faced with the mastery of integrated circuits. These products are the most significant factor in the whole electronics field. Everything that has taken place in the past 10 years in regard to increasing instruments and apparatus must be attributed to a large extent to semiconductor components and especially to integrated circuits.

Integrated circuits combine on a single base plate of silicon (a chip) formerly discrete component elements during a constant process of miniaturization and an increase in the number of elements per unit of space.

For instance, in 1975 state-of-the-art products had achieved a density of 15,000 elements on a chip with an area of 10 square millimeters. In 1985 a density of a million elements on a 50 square millimeter chip is expected, and the physical limit is estimated to be 25 million elements per chip. The significance of this development for instrumentation technology can be best comprehended through comparison with the capacities of their predecessors. A single contemporary integrated circuit costing $20 has the same memory capacity as the first IBM computer which weighed 35 tons and cost $1 million.

A special characteristic of this innovative integrative trend is the gradual change of the chip, once only a component, into a final product. This characteristic appears more frequently as the degree of integration of components on a chip increases. The whole collection of several thousand components is laid out on a chip not only topologically, but is also linked together systemically and becomes the bearer of complicated functions, which were previously characteristic only of final products. A recent concrete example is the appearance of the microprocessor which no longer forms a component, but a systemic subcomponent.

Electronic systems utilizing integrated technology have become more reliable and possess increased functional capacity, while weighing less and requiring less energy. These realities have become an accelerating factor in the penetration of electronics into other branches of the national economy. And not only this. As a consequence of the trends outlined above, changes are taking place in the relationships between the electronics industry and other industrial sectors. Deliveries of integrated circuits with a high-element density from the electronics industry are losing the character of a delivery of individual components, as we have already pointed out. They represent, basically, systemic subcomponents. This is enabling the rest of industry to create its own, applied innovative basis of electronics development in any and all fields with a special focus on its own specific vocation (agriculture, handling equipment, robots, mining and metallurgical industry, etc.).

Approximately 120 types of integrated circuits are produced in the CSSR, which is about 16 percent of the world mix, which amounts to about 750 unified types. There are, however, several thousand nonunified types abroad. An inadequate mix is a serious and often the decisive impediment to exportation, and even for the full application of numerous final products. In recent years Czechoslovak production has been matched by other countries, which are developing integrated circuits on the basis of licenses from leading world producers (BPR and FPR), and with the help of intensive investment activity. In addition to the CSSR, the GDR and the BPR have recently announced the mastery of large-scale integration. This technology will be mastered in the CSSR after 1980.

Therefore, the technical development of Czechoslovak electronics in the Seventh Five-Year Plan is directed to lessening the lag in the component basis of electronics, and to creating the prerequisites for basic product innovation at a later stage. At the same time the following goals will be pursued in products:

--An increase in their technical and aesthetic level;

--An increase in operational reliability, a lowering of energy requirements, a simplification of maintenance, service and organization;

--An increase in applicational adaptability, particularly in products of a systemic nature;

--An emphasis on the resolution of tasks leading to an increase in exports and a decrease in imports;

--A decrease in the work involved in production, in material and energy intensiveness;

--Concern on a systematic basis for product and forecasting reliability and product life cycle.

These goals must be achieved given an overall shortening of the innovation cycle stemming from the relatively early obsolesence of electronic products.

International and Czechoslovak unification and standardization applied in materials, components, and frames is an important factor for the rationalization of production.

Let us list several examples of technical development tasks from the electronics industry:

--Capless resistors of greater reliability, carrying capacity and stability, with a lowered temperature coefficient;

--Electrolytic capacitors with 30 percent smaller dimensions, as well as increased operational temperature and reliability;

--an increased assortment of semiconductor high-tension elements;

--microwave elements, especially for prospective microwave integrated circuits;

--optical elements for optical transmissions;

--power and high-tension transistors for controlled direct-current sources and feeder lines;

--microprocessors with expanded programming capacity;

--remote control circuits for consumer electronics;

--color picture tubes;

--power klystrons of high efficiency;

--electronic, local and central automatic telephone exchanges;

--analog carrier systems;

--systems for transmissions by optical fibers;

--radio and television transmitters;

--apparatuses for the public radio-telephone network;

--a number of color television receivers with new types of picture tubes;

--measuring systems controlled by microprocessors;

--electronic litography;

--applications of laser technology;

and it would be possible to continue with this ennumeration.

Although a number of the technical development tasks solved by the Czechoslovak electronics industry are worthy of praise, the domestic research and development basis will not be able--nor would the research and development basis of any other single nation in the world be able--to master all of the tasks which would eliminate the backwardness of this industry. Therefore, extensive scientific-technical cooperation is planned with the CEMA member countries along with certain acquisitions of licensed production designed to save time in areas where domestic development would be difficult.

At the same time it is a fact that the attention devoted to the development of an electronics industry will pay off extraordinarily well.

Let us take only the example of the application of the resources of electronics to agriculture. In livestock production the first task will be the automation of what today is for the most part mechanized work in the preparation (including storage) and transportation of feed rations, in the removal of manure, in machine milking (the automated stopping of milking systems) etc. Additional possibilities are evident in the identification of individual animals, in the selective provision of food rations, in the inspection of individual productivity, even in a situation of free pasturing, and in the automated inspection of the health of animals.

In plant production the communication, and when necessary the transmission, of data will play an important role throughout the vegetative cycle, both between fixed points--in which case it may be transmitted by the common telecommunications network--and between fixed and mobile objects (combines, transportation vehicles, groups of workers, etc.) working in the open. An important characteristic of this communication is not only its compatibility with the telecommunications network, but also its capacity for creating independent, autonomous circuits, conference links and hierarchical structures according to the changing requirements of agricultural work.

Remote or programmed control of the work of agricultural machinery will play a significant role in the preparation and sowing of the soil and in harvesting. This is a matter principally of automatically functioning (crewless) tractors for ploughing, of automated work with unhealthy materials (spraying, sprays), and work in noisy and otherwise harmful environments. New electronic systems will make possible the completely satisfactory mastery of the automation of the thinning of sugar beets, which is one of the most labor intensive and tiring of the manual tasks in agriculture.

The above applications do not exhaust all of the possibilities for the cybernetic and electronic transformation of agriculture. With regard to the planned growth of agricultural production and to the decline of the labor force, the introduction of cybernetic and electronic technology will become essential in the CSSR before 1990.

Another example of the application of electronics is the mining industry. In the Ostrava metallurgical and mining complex there has been the first introduction of specialized communication and command technology in the mines, including the utilization of links to civilian ultrashortwave bands for surface communication. The Tesla economic production unit has carried out the development and production of the ETZ 2 apparatus, which is designed for wireless communication between work groups and the control of combines at the face. The mobile part of the apparatus, in an explosion-proof version, is an integral part of the helmet along with the control, microphone and earphones, so as to leave the miner's hands free. Anyone from the crew can remotely stop the combine and organize the elimination of obstacles to the extraction. It is necessary to realize that the mining takes place in very low seams, where movement is restricted, as is the analysis of obstacles and communication among the crew. An equipment breakdown has understandable consequences for extraction. One minute of down time results in a loss of

2 to 5 tons of coal. The results of trial operations indicate that in addition to a significant increase in miner safety, the amount of coal mined increases by about 10 percent. Experts from the USSR, the PPR, and France have observed the ETZ 2 apparatus in operation. All stated that it represents an original solution unknown as yet on a world scale. All expressed an interest in deliveries. Accepting this figure of a 10 percent increase in extracted coal, the CSSR, will realize with the help of the ETZ 2 (which has been acquired for all mines) a 2.5 million-ton increase in yearly coal production.

There are additional positive examples. Deliveries from the electrotechnical industry and the results of its technical development are making possible increased labor productivity and lowered material and energy inputs in other branches as well.

Thus, for example, in the area of the fuels and energy complex the life expectancy of the driving motors of giant excavators has been increased by a factor of ten with the purchase of Micalastic license, thereby lowering maintenance costs, but above all reducing mining losses due to accidents.

The introduction of sealed 110 kilovolt distributors will lengthen the period between distributor overhauls to 5 to 7 years.

The automation and optimalization of the control of the temperature conditions and technological process of the arc furnaces at the Vitkovice Klement Gottwald Ironworks will be achieved by utilizing computer technology within the framework of the resolved task named "Automated Control Systems for Metallurgical Processes." This system will be applicable in other enterprises as well. Output will be increased by 4 percent, average electrode consumption will be lowered by 4 percent, and the life of the furnace lining will be increased by 5 percent. This represents a saving of Kcs 136 million over the useful life of the furnace.

In the area of fuel, energy and raw material conservation, a digital control system will be implemented, for example, at the Hodonin Brick Works national enterprise. This will lower technological fuel consumption by 4 percent and the reject rate by 30 percent, and it will reduce the work force by 25. The overall yearly savings will be Kcs 4 million which, given investment costs of approximately Kcs 6 to 7 million, implies a payback period of 1.5 to 1.75 years.

The replacement of vacuum tubes with semiconductor elements and their combination into integrated circuits makes possible a smaller size, material conservation, and a lowering of electrical energy consumption by about one third.

The introduction of electronic devices on motor vehicles lowers fuel consumption by 15 to 30 percent, and extends the life of the motor by 30 percent by lowering the amount of harmful pollutants which it produces.

The application of modern electrical light sources of greater efficiency will result in a yearly saving of electrical energy of about 900 million kilowatt hours.

The problem of electronic meters for heat commsumption has come to the forefront in relation to the overall fuel and energy situation. The introduction of the measurement of the consumption of warm service water and of heat will make possible an anticipated saving of 20 to 30 percent of current consumption.

The application of the newest generations of control systems to machine tools will bring not only increased technical sophistication of the final machine tool, but will also increase its reliability and lower the work involved in operating it. For instance, replacing a second generation FPS 40 system with a third generation NS 350 system resulted in a 42 percent saving in work time.

For textile machinery, electronic modification will bring the user a 50 to 70 percent labor force saving, up to a 50 percent saving in built-over surface, and a 20 to 30 percent lowering in machine weight, accompanied by improved performance and more rapid programming of textile patterns.

The increased reliability of components in computer technology by a factor of two will manifest itself in the course of 5 years in a lowering of 50 percent in maintenance and service requests. The increased degree of component integration will bring a tenfold decrease in weight and a lowering of electrical energy inputs for the same computational performance at one tenth of its original cost.

For electronic branch exchanges of the third generation, necessary work should decline by 85 percent at the same time that the demand for production space should decline by 80 percent. This will bring to the user a 40 to 50 percent decrease in the space required for installation, a 10 to 40 percent decline in the electrical energy inputs required, a 25 percent lowering in the volume of station batteries, a 50 percent lowering of assembly time, and a lowering of maintenance costs to 12 percent of their original amount.

The electronics industry has a very significant task in external relationships. At the same time, in this area as well there is a certain backwardness in the international division of labor. While worldwide this industry is characterized by high exports and a large amount of satisfaction of internal demand through imports, matters operate differently for us.

In a majority of fields the relation of import to export is about 1 to 1, though both imports and exports reach very small volumes. Transformers are an exception, for which exports are about 2.5 times greater than imports, as are electrical sources of heat (exports 7 times imports), parts for radiotechnology (exports 2.5 times imports), information processing machines (exports 3 times imports), apparatus for wire communication (exports 2 times imports), and electronic instruments (exports 2.7 times imports).

A small share for imports in the coverage of national economic needs is characteristic for most fields, representing in the Sixth Five-Year Plan, for example, 19 percent of the products of the electronics industry. The guaranteeing of office needs and computer technology requirements was an exception, with imports accounting for 46 percent of the former and 36 percent of the instruments. The satisfaction of needs through imports is substantially lower in all remaining fields. The international division of labor is insufficiently developed, then, in the branch of the electronics industry, and there are extensive prospective possibilities in this area. The export targets for the Seventh Five-Year Plan are more ambitious because they provide for a certain slackening of the export tempo to socialist countries, and for a significant increase in the pace of exports to non-socialist countries. In addition, export volumes are to be implemented on the basis of a relatively narrow spectrum of products, which is concentrated, regarding the nonsocialist countries, on the following products: electric motors, welding equipment, regulational and office technology, transmitters, telephone exchanges, record players, measuring instruments, stomatological technology, X-ray instruments, water meters and gas meters. In exports to the socialist countries computer technology, electronic capital equipment and additional health apparatuses are added to the above product mix. This means then that only a part of the total production mix is exported.

All of this implies that the electronics industry confronts no small task. Rather, it faces a program not for one, but for two five-year plans. And this has resulted from a concentration on the problems of only a single part of the electrotechnical industry, on electronics. The whole branch has tasks which are more extensive and broader, about which it may be possible to say more in a future article.

9276
CSO: 2402

NEW TYPES OF AGRICULTURAL MACHINERY FOR SEVENTH FIVE-YEAR PLAN

Prague TECHNICKY TYDENIK in Czech 1 Jul 80 p 6

[Article by Eng Dusan Hutla: "Machinery for Seventh Five-Year Plan Designed by Research Institute of Agricultural Machinery in Prague 4--Chodov"]

> [Text] Predictions of agricultural development are anticipating further growth of production through strengthened and newly established integrated and specialized production units extensively utilizing mechanization, chemicals and automation. Possibilities for further expansion of agricultural production are corroborated by the assumed rising trends of hectare yields of agricultural products and of animal production. With these trends there must be corresponding advances in technical-economic parameters of mechanization equipment.

Foundation for Development

The increase of hectare yields and of animal production depends on the solution of transportation problems. Even now transportation is a limiting factor in further development and effective use of many types of machinery and agricultural technology.

Designing new mechanized equipment and agricultural technology further demands that only those solutions be used which require minimum energy consumption and result in labor and material savings. The total impact of technology on work and home environments and on problems of health and work safety is also an important criterion.

A new factor in the development of agricultural technology is the recognition of the differences between the trends of expanding mechanization in some agricultural fields in the CEMA and in capitalist countries. This means different future demands on designs of some machinery destined for export to capitalistic countries and for socialist agricultural production.

All trends of technological development in this field must also take into account that our agricultural machinery production is not capable of meeting the needs of Czechoslovak agriculture in the whole range of products and that these problems are being solved through an established international division of labor within the CEMA framework, encompassing specialization in the field of research, development, production and deliveries of agricultural machinery.

The main tasks of technical development for the Seventh Five-Year Plan essentially have already been formulated and point out the future direction of the basic research and development of agricultural machinery. New automatic machinery of the second generation was already designed in the last years of the Sixth Five-Year Plan, and machinery should be developed and completed in the first years of the next Five-Year Plan.

Needs of Mountain Areas

For complex cultivating and harvesting of forage in the mountain meadows and pastures, in cooperation with the Research Institute of Agricultural Machinery in Prague, Agrostroj Pelhrimov is designing an automatic machine for mechanized forage handling on sloping land, the ZTRS-310. Its design is unique in the world in its robustness and achieved output, and it meets the unusual demands which agricultural work places on such machinery.

Its basis is an MT-6-011 traction unit with adaptor implements: a PB-2-051 rotary pasture tiller, an SP2-181 rotary mower, an RNZ-1 industrial fertilizer spreader, a sower for plowless planting, and an SP-4-041 forage turner-windrower. The MT-6-011 traction unit is equipped with a Skoda M-634 four-cycle six-cylinder water-cooled combustion engine having an output of 132 kW and a direct fuel injection used in Skoda LIAZ trucks.

The chassis allows the machine to move in sloping and uneven terrain; it has a two-axle, four-wheel drive. The steering is hydraulic and the mechanism makes the engagement of all four wheels possible. The drive is four-speed hydraulic. Both axles have a nonslip differential. A hydraulic system facilitates the handling of the front coupling and work implements.

A safety two-door cabin is spring-mounted and airconditioned. The weight of the machine is 6,400 kg, its operating speed 7 to 11 km per hour $^{-1}$ depending on the conditions, and road speed up to 24 km per hour $^{-1}$. Slope accessibility is 20 degrees on the average, depending on local conditions.

Quite Unique

To eliminate heavy manual labor in sugar beet cultivation Agrostroj Jicin developed a tractor called a "Twelve-rower for sugar beet planting, cultivating and thinning" (automatic 12-USCS). It is specialized for all CEMA countries. The design is unique; no similar machine is produced anywhere else in the world. The base is an automatic chassis--universal carrier

NECS allowing alternate mounting of various implements. This system allows for planting of sugar beets, for example, with possible strip spraying of herbicides, cultivating of sprouted stands with a rotary or passive weeder and automatic thinning of the stands.

An automatic harvester of the second generation is another developmental type following the now produced SPS-420 and SPZ-421 type automatic cutters. It has substantially higher parameters. The output is 20 to 30 kg per s^{-1} for corn, 20 to 25 kg per s^{-1} for thin-stalk forage, 8.5 kg per s^{-1} for withered forage and 7 to 9 kg per s^{-1} for hay and straw.

Energy requirements of the drum loader, chopper drum and cutforage conveyor at the stationary work site were determined in the Research Institute of Agricultural Machinery. In cooperation with Agrostroj enterprise of Prostejov, two different models were designed for conveying cut forage from the chopper drum to the transport vehicles. They need 70 and 30 percent less energy, respectively, than the conventional thrower. Furthermore, suitable adjustment of the drum, which prevents partial rotation of cut forage inside it, reduced the energy requirement of the drum by as much as 24 kW at the output of 23 kg per s^{-1}, i.e., a reduction of the standard power requirement by 1 kW per kg/s^{-1}. Line production of this machine is scheduled to start in 1982.

Like the silage harvester, the sugar beet cutter is at a similar stage. A six-row automatic cutter of the second generation is being designed by the institute; it will be equipped with a hydraulic drive and hydraulic control of other operational parts. The cutter is for two-phase harvesting of beet tops; this method will insure substantial reduction of admixtures, earth in particular. The beet tops will be cut with a precutting device in the first phase, and the final root harvesting will be accomplished with a cutter-digger in the second phase. The machine has an output of 1.6 hectare per hour -1 and an operating speed of up to 11 km per hour -1. It is equipped with a Zetor engine--supercharged six-cylinder with an output of 110 kW. The first operational model was tested in 1977. Line production is planned for 1983 in Agrostroj Jicin.

Useful Life, Reliability

In the Seventh Five-Year Plan the Research Institute of Agricultural Machinery will deal with problems of increased performance and reduction of material and energy requirements in the framework of the national task of "Increased useful life and reliability at low relative weight and improved operational characteristics of the principal products of the agricultural machinery sector." It is also assumed that polygonal tests (i.e. circular tracks with obstacles) currently in use will be employed in fatigue testing. Furthermore, tests of the useful life of the agricultural machinery components with an Inova electrohydraulic device should be expanded. Possible laboratory testing of larger units will be studied and plans will be prepared for construction of a new strength testing facility after 1985 which, in addition to the testing of the details, will also permit laboratory testing of whole structures of agricultural machinery.

In addition to modernization of the second generation machinery, in the next Five-Year Plan research will explore new elements and principles of agricultural machinery; in particular, for harvesters of forage, sugar beets and potatoes; harvesters of hops; potato planters; and soil cultivators and sowers, in order to create conditions for designs of the next generation machinery in the Eighth Five-Year Plan.

Meeting the Needs

Animal production has also seen dynamic growth, especially the application of computer technology in the management of production and technological processes in the large-capacity milk cow stables. In conjuction with the work on an automated system of production management in the large-scale breeding of milk cows, and taking into consideration the needs for economy in the use of feed and an increase in the production of beef, the next phase of research and development must likewise be directed at automating the system of beef production. Maximum gain of cattle per feed with a minimum feed consumption is the basic goal. We believe that the system of automatic following of the improvements (daily gains) in the groups, or the individuals, must be verified in conjunction with the automatic system of feeding.

In summary we can thus characterize further direction of research and development as follows:

1. Modernization of the second generation machinery aimed at increased serviceability, indicators of work quality, share of automation and hydraulic systems, safety and work health conditions and reduced material and energy requirements.

2. Exploratory research creating conditions for designs of the next generation machinery.

3. Utilization of computer technology in management of production and technological processes.

The research and development thus formulated for the Seventh Five-Year Plan is being checked and refined from the standpoint of the conclusions of the 13th Session of the CPCZ Central Committee. One can state that the recommended content of technological development which is based on the needs of agriculture and machinery prospects, and which respects the agreements on international socialist division of labor, is basically in conformance with the conclusions of the 13th session. This indicates that technical development in this area can keep up with the practical needs. The state of the production base of agricultural machinery is not quite satisfactory, however.

9562
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CZECHOSLOVAKIA

BRIEFS

CSSR AID TO CUBA--Czechoslovakia has been participating in construction of the Nuevitas power station, located about 700 km east of Havana, Cuba. Electrical power will be produced by three power blocks, each block producing 125 megawatts. Prague enterprise Teplotechna has constructed in Cuba a 180-meter high reinforced concrete smokestack, to date the highest in Latin America. [Prague SVOBODNE SLOVO in Czech 28 Aug 80 p 1]

CSO: 2402

LONG-TERM AIMS OF BASIC RESEARCH OUTLINED

West German Commentary

Bonn IWE-TAGESDIENST in German No 64, 25 Apr 80 p 3

[Report from Berlin: "GDR Scientific Strategy in Process of Revision." A translation of the East Berlin BERLINER ZEITUNG item referred to below follows this commentary]

[Text] The long-range strategy in basic research in science and mathematics in the GDR, is currently being revised, its projected time range being extended beyond the year 1990. In this connection, GDR Academy of Sciences Deputy President Prof Hermann Klare has called for an "excellently planned and intelligently thought out scientific planning process"; because the GDR must appraise soberly the scientific capacities at its disposal. Its share of the world's scientific capacity amounts to a maximum of 2 percent, and this clearly defines its limitations. From this follows the unequivocal necessity to do research primarily in fields that are of vital necessity for the GDR. The problem is one of formulating long-range planning in a way that the research potential indispensable for society and economy is arranged according to rank of relative indispensability and that all the other fields of research in which the GDR must unconditionally contribute to the development of world science are still represented to a sufficient degree. (BERLINER ZEITUNG 24 April 80)

Interview With Academy Vice President

East Berlin BERLINER ZEITUNG in German 24 Apr 80 p 3

[Interview with Prof Dr Hermann Klare, vice president, GDR Academy of Sciences by Dr Karl-Heinz Gerstner: "On Research Concentration and Cooperation With Industry"]

> [Text] The 11th SED Central Committee meeting has in several respects defined and enlarged the tasks of the scientists. We asked Prof Dr Hermann Klare to inform us about the conclusions drawn by the Academy of Sciences.

[Question] What new points of view for scientific work were developed by the 11th SED Central Committee Meeting?

[Answer] The 11th SED Central Committee Meeting formulated the vital importance of scientific achievement beyond the state of current awareness. Only through excellent scientific results can we keep our position in the world market and enact our social programs in the way we planned. This was expressed clearly and unequivocally by the 11th SED Central Committee Meeting.

This task calls for an excellently planned and intelligently thought out scientific planning process, because we must appraise soberly the scientific capacities available to us. Our share of the world's scientific capacity amounts to a maximum of about 2 percent. This clearly defines our limitations, and from this results the clear necessity to do research primarily in fields that are of vital necessity to us.

There are, no doubt, dangers in a selection of this kind because we must not, in any way, sweep under the rug everything that is not of vital necessity. Nobody should have the notion of canceling research in astronomy or archeology. But research work should be restricted in fields where, at the present time, no internationally competitive standards can be expected.

The Art of Research Planning

Long-range research planning also calls for dealing with questions whose usefulness cannot be evaluated at the present time. The art of long-range planning consists precisely in so formulating long-range plans that research potential that is indispensable for society and economy is rated in the necessary order of importance and that the remainder of the research which the GDR must unconditionally contribute to the development of world science is represented in a still sufficient degree. In making these plans, it is necessary to have the courage to impose limitations, and to have observer groups continue the work of research teams.

A plan of this kind must also be flexible and dynamic. It was developed as early as 1974 by the academy and the system of higher education as a long-range plan for basic research in the natural sciences and mathematics as well as in selected fields of technology up to 1990. This plan is presently being revised and extended beyond 1990. From it will be devised and defined the next five-year plan 1981 to 1985.

Our limitation of research areas, which is imposed by limitations in capacity, will be considerably enlarged through work division and cooperation with friendly socialist countries. Cooperation with CEMA countries has been broadly developed in past years, and the mutual advantage of this policy is considerable. I must point out emphatically, however, that cooperation of this kind is based on mutuality. We are of interest to our partners only as long as we can offer first-rate products: there is no demand for mediocre results.

[Question] How can top achievements in scientific research be stimulated?

[Answer] In all areas we must create preconditions for creative activity. Neither the government nor the academy is willing to give long-range financial support to mediocre achievements. The academy has introduced a system of salary payments based on achievement, but there is still a certain hesitation to cancel salary increases in cases of disappointing performance.

Salary based on achievement assumes, however, that each group leader knows his coworkers well and judges them regularly, at least once a year. We must insist on such evaluation which, incidentally, is required by labor laws.

On the other hand, the group leader himself must set an example in his scientific work, or else there will be serious conflicts. If there are disagreements about his achievement evaluations, these must be discussed openly by the scientific collective. This may seem a time-consuming process--and in most cases it is--but it is the only way to evaluate scientific achievement which cannot be measured, like achievements in sports, in centimeters, grams, and seconds.

[Question] Do scientific circles value basic research more highly than the application of its results?

[Answer] In principle, this problem, which we had to discuss a few years ago, has been overcome. If, however, you can still hear the opinion that technology is not really science and that, therefore, technologists are either not at all creative or only conditionally so, then the nonsensical quality of such opinions has to be brought out into the open.

I would like to call to mind the development of the diesel engine, the utilization of the dynamo principle, the technical realization of ammoniac synthesis from the nitrogen of the air, the principles of coal chemistry which have once again become so important in our time, nuclear power production, chemical fiber fabrication and the new technological processes resulting from the utilization of microelectronics. The British scientist Bernal probably reduced this to the shortest formula: in the process of solving practical problems new aspects of nature have been discovered again and again, and conversely practical work dries up and wastes away whenever it is not constantly revitalized by abstract thought.

Technology Stands in the Center

Gustav Hertz once made the following logical statement: The goal of a physicist's work is the solution of technical problems. This is true also for those working in basic research. With each new discovery the question should be asked: are there technical applications for this work? This is only possible when the physicist knows the problems of his branch of industry, and is interested in them. When his interests have to be continually stimulated, he should do something else.

[Question] In your opinion, where can technological work best be organized--in institutes or in industrial enterprises?

[Answer] Technological research, which can be done with small research facilities, is usually best done in scientific institutes. When larger pilot equipment is necessary and work must be done not in the kilo but ton range, industrial enterprises are better suited for technological research.

My successor as president of the academy, Prof Dr Werner Scheler, said in his colloquium address at the Eleventh Plenum: "It is certainly necessary that the Academy strengthens its technical-technological basis--even though this is more than complicated under present economic conditions--but we are directing our efforts more strongly in the direction of having the VEBs develop and specialize their research and development potential so that pilot tests and application research can be carried out to a greater extent."

Professors With Practical Experience

In any case, close partnership between scientific institutes and industrial enterprises during the introduction of new technology is indispensable. This cooperation has frequently been lacking in the past, and even today there is still a large potential for closer cooperation. In Japan I observed that scientific institutes are constantly asked by industry what new developments have taken place. At the 25th CPSU Congress, Brezhnev made the logical statement that industry should tear new developments out of the hands of the institutes. We have made progress in this direction in the past years, but the standards set by the Eleventh Plenum have not yet been met.

[Question] Are scientific research results being applied to practice fast enough?

[Answer] The application of research results to industrial practice frequently still occurs too slowly in our system. We must solve these problems, which have occupied us for many years. For scientists, planners and members of industry this is an important common task whose fulfillment will admit no further delay even if this should mean sacrificing one or the other sacred cow.

I am asking the question: is there sufficient stimulation in the planning for the application of research results to practice and for taking the technical-economic risks involved in this process? I am of the opinion that we must ask and answer questions of this kind if we want to meet the standards set by the Eleventh Plenum.

[Question] What do we expect from a technologist today?

[Answer] Because technology is part of the sciences, we expect of a technologist, in principle, the same as is expected of any scientist: industry, dedication, imagination, patience, curiosity and, above all, thorough knowledge together with a well-developed combination ability: the capacity to think of things that have not been thought of before.

[Question] What wishes do you have for the GDR conference on higher education which is to take place in fall?

[Answer] At this point, I want to limit myself to a few wishes:

a. Greater independence should be provided for students in advanced semesters, as well as the opportunity for them to attend lectures that do not necessarily belong to their field of specialization.

b. A stronger fluction between institutes of higher learning, universities, industry and the academy that includes younger and older advanced school cadres. Many professors in the natural science disciplines are lacking in experience in industry, and the same is true of the directors of academy institutes--only about 10 percent of them have this kind of experience.

c. A decrease in administrative costs for advanced school cadres and industry directors is certainly desirable. There is a special need for modern office equipment.

d. There should be stronger personal relations between advanced school teachers and students.

e. Here too, the achievement principle should be pursued.

[Question] Is it possible to program scientific research work?

[Answer] Within reasonable limits, this is even necessary. No country in the world can today make progress without research planning, and anybody who today still defends the so-called principle of free research, simply overlooks the fact that no country can any longer afford such boundless research.

I consider our system of research planning, which is done exclusively by scientists, as well developed and in the truest sense democratic. What is provided by the government are the means and the personnel, but even these points can be discussed and changed in the course of economic planning.

What disturbs us at times are certain attempts to improve research planning and accounting. However, these defects can be corrected through trusting cooperation between groups of scientists, the research council, the academy and advanced schools on the one side and the planning commission and the Ministry for Science and Technology on the other, whenever certain planning methods of scientific work are no longer useful. Corrections of this kind have been made especially in the recent past.

Political Work Of the First Rank

Science planning and science organization are just as much part of a continually developing dynamic organism as research itself, and they can and must therefore be adapted to new evolving circumstances. In this respect we have learned much in the past years, since all scientists have realized that what they are doing is political work of the first rank. In spite of this, I believe that scientists will always complain about too much bureaucracy. This could be called, a little maliciously, somewhat of a status symbol.

8889
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COMPETITIONS, AWARDS FOR STUDIES IN MILITARY MEDICINE

Budapest HONVEDORVOS in Hungarian Nos 3, 4, Jul-Dec 79 pp 317-318

[Text] The presidium of the Medical Scientific Council of the Hungarian People's Army is announcing a competition for the purpose of promoting scientific work conducted in the army in the interest of increasing the combat capability of the army's health service. The competition calls for independent, unpublished studies on the following topics:

1. Rapid diagnostic, clinical, and laboratory procedures which may be used in case of mass injuries and an influx of patients;

2. Use of computer technology in the various fields of the health service;

3. Information on the history of military hygiene;

4. Modernization of military health system in times of peace;

5. Actual issues of professional knowledge in military medicine;

6. Organizational problems in ensuring hygiene in times of combat;

7. Problems of selection and suitability for service in the various branches military hygiene;

8. Actual problems of military radiation biology and toxicology;

9. Actual problems of field surgery and internal medicine;

10. Problems of the health and epidemiological care of wounded behind the lines;

11. Planning and organization of blood supply in case of war;

Prizes per topic: first prize, 3000 forints; second prize, 2000 forints; third prize, 1000 forints.

Prize winners of previous competitions: special first prize for studies in priority categories:

First prize, 3500 forints, awarded to Dr Gyorgy Szklenarik, military major, and Jozsef Fulop, first aid for poisoning resulting from cholinesterase inhibitors.

Second prize to Dr Laszlo Mate, Lt Col, for his study on determination of cholinesterase activity and diagnostic value of the activity.

CSO: 2502

HUNGARY

BRIEFS

THIN FILM ANALYSIS SYSTEM--Analysis of thin film phenomena helps reveal the secrets of matter and nature. These phenomena are the ones which occur only on the surface, on an extremely thin cross section of a substance in its very pure version; that is, they take place or can take place in the thin film. This is all the more worthy of mention, because it has been over a decade since Hungarian researchers evolved a special experimental and investigative method, the so-called ultra-vaccuum electron microscopic distillation which makes possible the simultaneous study of the phenomena occurring in the thin films in the course of the film-forming process and the change of the latter on the basis of data from the former, for instance, in the course of fabrication of electronic elements. This method has achieved international success in less than 10 years and enhanced the reputation of the Technical Physics Research Institute of the Hungarian Academy of Sciences which is one of the most important centers of thin film research in Hungary. [Exceprt] [Budapest NEPSZABADSAG in Hungarian 19 Aug 80 p 10]

CSO: 2502

BRIEFS

FIRST TOOTH TRANSPLANT--An article in the Bucharest daily INFORMATIA BUCURESTIULUI in Romanian of 27 August 1980, page 6, reports that a collective headed by Dr Dragos Panteleiciuc of the Stirbei Voda dental dispensary in Bucharest recently performed "the first tooth transplant in the world," transplanting an "extra" tooth from the mouth of a 15-year-old girl to the mouth of a 56-year-old man. "The operation was preceded by 11 tests to determine the genetic compatibility of the donor and the recipient. The girl's tooth was extracted in a relatively routine but very careful operation and transplanted into the alveolus of the mouth of the recipient. Then, all the teeth of the recipient were encased in a cast. After a short time, the cast was removed and now, more than a month after the operation, both patients have recovered completely. The great advantage of the method is the fact that the alveolar-dental ligament, the apparatus supporting the tooth, is preserved." [Editorial Report]

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